

# P R O J E C T facts

DEPARTMENT OF ENERGY  
OFFICE OF FOSSIL ENERGY

**OIL recovery**  
P R O G R A M

## **BUREAU OF ECONOMIC GEOLOGY FIELD TEST — STRATEGIES TO MAXIMIZE RECOVERY IN THE DELAWARE BASIN**

### **PRIMARY PROJECT PARTNER**

**The University of Texas  
Bureau of Economic Geology  
Austin, TX**

### **FOSSIL ENERGY PROGRAM**

**Oil Recovery Field  
Demonstrations**

### **MAIN SITES Austin, TX**

**Geraldine Ford & Ford  
West Fields**

Austin, TX  
Culberson County, TX  
Reeves County, TX

### **TOTAL ESTIMATED COST**

**\$3.2 million**

### **COST SHARING**

**DOE - \$1.6 million  
Non-DOE - \$1.6 million**

**DE-FC22 - 95BC14936**

### **Project Description**

As part of the Department of Energy's Class III Oil Recovery Field Demonstration Program, The University of Texas Bureau of Economic Geology (BEG) and Conoco, Inc., will demonstrate the utility of reservoir characterization—accurate, detailed description of oil reservoir conditions—in designing cost-effective drilling and recovery processes that could increase production and prevent abandonment of oil reservoirs in mature West Texas fields.

The project will compare reservoir performance in two representative Delaware Basin fields, followed by a demonstration project in one. Only 26% of the original oil in place has been recovered from the Geraldine Ford Field, and less than 5% from the Ford West Field, which produces from a different rock formation. Delaware Mountain Group reservoirs present problems in both exploration and production—the oil is contained in small, thin sandstone lenses encased in impervious siltstones, creating isolated, untapped and poorly drained compartments scattered throughout most of the fields. More accurate knowledge of the spacing, size and interconnected drainage between these oil reservoir “pods” would increase the operators’ ability to design more effective drilling and production strategies.

BEG and Conoco are using state-of-the-art seismic, well, imaging, outcrop and production data and computer simulation to provide a detailed reservoir model of the two fields. Predictive models derived from comparison of producibility differences related to reservoir rock variations will assist the design and implementation of geologically targeted infill drilling to contact isolated oil-bearing lenses and the use of an enhanced oil recovery process—either carbon dioxide, polymer, or waterflooding—to achieve optimum production.

As of early 1996, the 3-D seismic data has been acquired and analysis is underway. Reservoir characterization has started with the gathering of wireline log and core data and construction of a data base.

### **Program Goal**

A major goal of DOE's Oil Program is maintaining access to the wells in mature and marginal fields for application of available and developing technologies that can reduce operating costs and increase production. A common problem limiting production in many fields is variation in type, thickness and continuity of reservoir strata, creating isolated “pods” of oil that are difficult to locate, drill and produce.

Improved methods of “seeing” the reservoir makeup are needed to find these potential reserves. This project is designed to demonstrate the advantages of using modern three-dimensional seismic surveys, advanced imaging techniques and computer simulation to determine the optimal location of new wells and select the most efficient oil recovery processes that will upgrade the performance of oil fields in the Delaware Basin. If successful, project results can be applied to more than 100 other “plays” in the Basin, which collectively contain 1.5 billion barrels of remaining oil.

### **Project Partners**

**THE UNIVERSITY OF TEXAS  
BUREAU OF ECONOMIC GEOLOGY  
Austin, TX**

**CONOCO, INC.  
Midland, TX**

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## Project Benefits

One of the most important lessons learned from 74 years of reservoir development in the Texas/New Mexico Permian Basin is that comprehensive geologic and engineering investigations of the characteristics of oil reservoir strata are essential prerequisites for designing efficient production strategies. Production operations undertaken without reservoir characterization will not realize maximum recovery and economic return.

If the Bureau of Economic Geology and Conoco can demonstrate the effectiveness of geologically targeted infill drilling and enhanced oil recovery, operators could be prompted to use the technology, which would help maintain access to the estimated 686 million barrels of mobile oil and 872 million barrels of residual (immobile) oil in Delaware Basin reservoirs. The BEG estimates that application of the technology to just Geraldine Ford and Ford West Fields could result in production of an additional 12 million barrels of oil. Every extra barrel of oil provides increased federal, state and local tax revenues, along with beneficial impact on local economies.

The BEG further estimates that application of the technology throughout the Delaware Basin to reservoirs in the same rock formations investigated in the project could result in production of an additional 210 million barrels of oil—123 million barrels of mobile oil from infill drilling, and 87 million barrels of residual oil from improved CO<sub>2</sub> flooding. Application of the technology to other similar reservoirs in different rock formations in the Permian Basin has potential for another 110 million barrels of incremental oil.

## CONTACT POINTS

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## Cost Profile (Dollars in Millions)

	03/31/95	Budget Period 1	03/30/97	Budget Period 2	03/30/99
Department of Energy*		\$1.0		\$0.6	
Private Sector Partners		\$1.0		\$0.6	

\* Obligated Funding

## Key Milestones

